

What is claimed is:

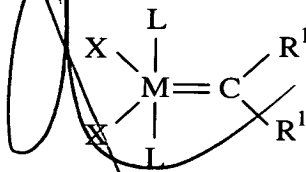
1. An adhesive or coating comprising a composition prepared by mixing together:
(a) at least one metathesizable material comprising a highly-reactive
5 cycloolefin; and
(b) at least one metathesis catalyst.

2. An adhesive or coating according to claim 1, wherein the metathesizable material is selected from norbornadiene, norbornene and cyclobutene.

3. An adhesive or coating according to claim 2, wherein the metathesizable material comprises at least one norbornadiene.

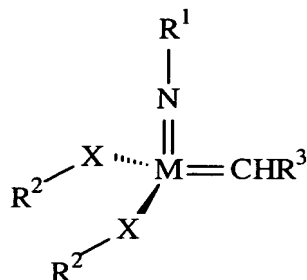
4. An adhesive or coating according to claim 1, wherein the molar ratio of
15 metathesizable material to catalyst ranges from about 100:1 to about 10,000:1.

5. An adhesive or coating comprising a composition prepared by mixing together:
(a) at least one metathesizable material; and
(b) a single catalyst having a structure represented by



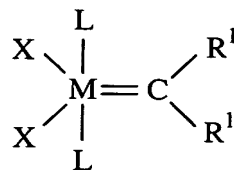
- 20 wherein M is Os, Ru or Ir; each R¹ is the same or different and is H, alkenyl, alkynyl, alkyl, aryl, alkaryl, aralkyl, carboxylate, alkoxy, allenylidenyl, indenyl, alkylalkenylcarboxy, alkenylalkoxy, alkenylaryl, alkynylalkoxy, aryloxy, alkoxyacarbonyl, alkylthio, alkylsulfonyl, alkylsulfinyl, amino or amido; X is the
25 same or different and is an anionic ligand group; and L is the same or different and is a neutral electron donor group;

or having a structure represented by

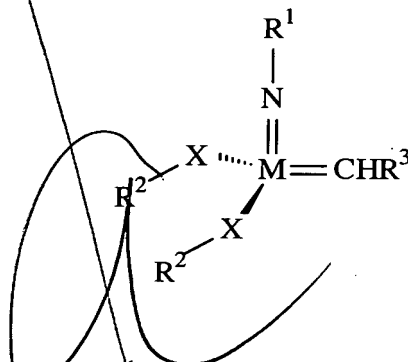


- 5 wherein M is Mo or W; X is O or S; R¹ is an alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or a silicon-containing analog thereof; R² are each individually the same or different and are hydrogen, alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or together form a heterocyclic or cycloalkyl ring; and R³ is alkyl, aryl, aralkyl or alkaryl.
- 10 6. An adhesive or coating according to claim 5, wherein the metathesizable material comprises at least one norbornadiene.
7. An adhesive or coating comprising a composition prepared by mixing together:
- 15 (a) at least one cycloolefin monomer;
- (b) at least one liquid metathesis oligomer or polymer; and
- (c) at least one metathesis catalyst.
8. An adhesive or coating according to claim 7, wherein the cycloolefin monomer is
- 20 selected from norbornadiene, norbornene and cyclobutene.
9. An adhesive or coating according to claim 7, wherein the metathesis oligomer or polymer comprises an oligomer or polymer of cyclopentene, cyclohexene, 3-ethylcyclopentene, 8-methoxy tricyclo[5.2.1.0^{2,6}]-4-decene, 4-methylcyclohexene,
- 25 and 4-methoxymethylcyclohexene.
10. An adhesive comprising a composition prepared by mixing together:

- (a) at least one metathesizable material; and
 (b) at least one catalyst having a structure represented by



- wherein M is Os, Ru or Ir; each R¹ is the same or different and is H, alkenyl,
 5 alkenyl, alkynyl, alkyl, aryl, alkaryl, aralkyl, carboxylate, alkoxy, allenylidenyl, indenyl,
 alkylalkenylcarboxy, alkenylalkoxy, alkenylaryl, alkynylalkoxy, aryloxy,
 alkoxycarbonyl, alkylthio, alkylsulfonyl, alkylsulfinyl, amino or amido; X is the
 same or different and is an anionic ligand group; and L is the same or different and
 includes a trialkylphosphine, an imidazol-2-ylidene or a dihydroimidazol-2-ylidene;
 10 or having a structure represented by



- wherein M is Mo or W; X is O or S; R¹ is an alkyl, aryl, aralkyl, alkaryl, haloalkyl,
 15 haloaryl, haloaralkyl, or a silicon-containing analog thereof; R² are each individually
 the same or different and are hydrogen, alkyl, aryl, aralkyl, alkaryl, haloalkyl,
 haloaryl, haloaralkyl, or together form a heterocyclic or cycloalkyl ring; and R³ is
 alkyl, aryl, aralkyl or alkaryl.

11. An adhesive according to claim 10, wherein L comprises a dihydroimidazol-2-ylidene.
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 12. A two-part reactive adhesive or coating system comprising:
 (a) a first part comprising at least one first metathesizable material; and

(b) a second part comprising (i) at least one liquid metathesis oligomer or polymer and (ii) at least one metathesis catalyst.

13. A two-part system according to claim 12, wherein the liquid metathesis oligomer or polymer comprises an oligomer or polymer of cyclopentene, cyclohexene, 3-ethylcyclopentene, 8-methoxy tricyclo[5.2.1.0^{2,6}]-4-decene, 4-methylcyclohexene, and 4-methoxymethylcyclohexene.

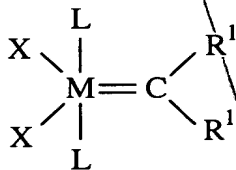
14. A two-part system according to claim 12, wherein the first metathesizable material comprises at least one highly-reactive cycloolefin.

15. A two-part system according to claim 12, wherein the first metathesizable material is selected from norbornadiene, norbornene and cyclobutene.

16. A two-part system according to claim 13, wherein the first metathesizable material comprises at least one norbornadiene.

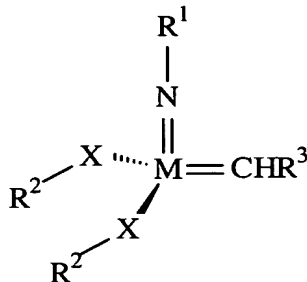
17. A two-part system according to claim 16, wherein the first part further comprises at least one other cycloolefin.

18. A two-part system according to claim 12, wherein the metathesis catalyst comprises a compound having a structure represented by



wherein M is Os, Ru or Ir; each R¹ is the same or different and is H, alkenyl, alkynyl, alkyl, aryl, alkaryl, aralkyl, carboxylate, alkoxy, allenylidenyl, indenyl, alkylalkenylcarboxy, alkenylalkoxy, alkenylaryl, alkynylalkoxy, aryloxy, alkoxycarbonyl, alkylthio, alkylsulfonyl, alkylsulfinyl, amino or amido; X is the same or different and is an anionic ligand group; and L is the same or different and is a neutral electron donor group;

or having a structure represented by



5 wherein M is Mo or W; X is O or S; R¹ is an alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or a silicon-containing analog thereof; R² are each individually the same or different and are hydrogen, alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or together form a heterocyclic or cycloalkyl ring; and R³ is alkyl, aryl, aralkyl or alkaryl.

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19. A two-part system according to claim 12, wherein the first part further comprises a catalyst promoter.

20. A two-part reactive adhesive or coating system comprising:

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- (a) a first part comprising at least one first metathesizable material; and
- (b) a second part prepared by mixing together at least one metathesis catalyst and at least one metathesizable monomer that forms a liquid metathesis oligomer or polymer in the presence of the metathesis catalyst.

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21. A two-part system according to claim 20, wherein the metathesizable monomer is selected from cyclopentene, cyclohexene, 3-ethylcyclopentene, 8-methoxy tricyclo[5.2.1.0^{2,6}]-4-decene, 4-methylcyclohexene, and 4-methoxymethylcyclohexene.

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22. A two-part system according to claim 20, wherein the first metathesizable material is selected from norbornadiene, norbornene and cyclobutene.

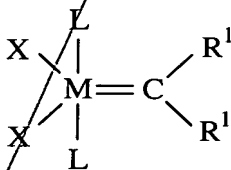
23. A two-part reactive adhesive or coating system comprising:
 - (a) a pre-mixed first part comprising at least one metathesizable material comprising a highly-reactive cycloolefin; and
 - (b) a pre-mixed second part comprising at least one metathesis catalyst.
24. A two-part system according to claim 23, wherein the metathesizable material is selected from norbornadiene, norbornene and cyclobutene.
25. A two-part reactive adhesive or coating product comprising:
 - (a) a first container containing a first composition having a viscosity of at least about 10 cP at 25°C and comprising at least one metathesizable material; and
 - (b) a second container containing a second composition having a viscosity of at least about 10 cP at 25°C and comprising at least one metathesis catalyst.
26. An adhesive or coating composition comprising:
 - (a) at least one norbornadiene monomer; and
 - (b) at least one other metathesizable material.
27. An adhesive- or coating-dispensing system comprising:
 - (a) a first container containing a first composition comprising at least one metathesizable material wherein the first composition has a viscosity of at least about 10 cP at 25°C;
 - (b) a second container containing a second composition comprising at least one metathesis catalyst wherein the second composition has a viscosity of at least about 10 cP at 25°C;
 - (c) means for displacing the first composition from the first container;
 - (d) means for displacing the second composition from the second container; and
 - (e) a member that includes (i) elements that mix together the first composition and the second composition to produce an adhesive or coating and (ii) an orifice through which the adhesive or coating exits onto a substrate.

28. A two-part adhesive or coating product according to claim 25, wherein the first composition and the second composition have a shelf life of at least about 3 months.

29. A two-part adhesive or coating product according to claim 25, wherein at least one of the first and the second composition further comprises at least one thickening additive.

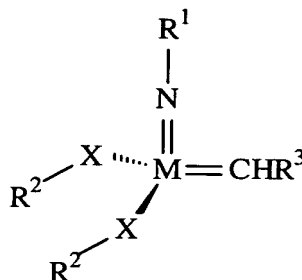
30. A method for adhering together at least two substrates, the method comprising:
(a) applying an adhesive composition to at least one substrate, the adhesive comprising a composition prepared by mixing together (i) at least one metathesizable material comprising a highly-reactive cycloolefin and (ii) at least one metathesis catalyst; and
(b) adhering together the substrates.

31. A method according to claim 30, wherein the metathesis catalyst comprises a compound having a structure represented by



wherein M is Os, Ru or Ir; each R¹ is the same or different and is H, alkenyl, alkynyl, alkyl, aryl, alkaryl, aralkyl, carboxylate, alkoxy, allenylidenyl, indenyl, alkylalkenylcarboxy, alkenylalkoxy, alkenylaryl, alkynylalkoxy, aryloxy, alkoxycarbonyl, alkylthio, alkylsulfonyl, alkylsulfinyl, amido or amino; X is the same or different and is an anionic ligand group; and L is the same or different and is a neutral electron donor group;

or having a structure represented by



- 5 wherein M is Mo or W; X is O or S; R¹ is an alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or a silicon-containing analog thereof; R² are each individually the same or different and are hydrogen, alkyl, aryl, aralkyl, alkaryl, haloalkyl, haloaryl, haloaralkyl, or together form a heterocyclic or cycloalkyl ring; and R³ is alkyl, aryl, aralkyl or alkaryl.
- 10 ~~32.~~ A method according to claim ~~30~~, wherein the adhesive further comprises a liquid metathesis oligomer or polymer as an ingredient.
- 15 ~~33.~~ A method according to claim ~~30~~, wherein at least one of the substrates is a low-surface-tension substrate.
- ~~34.~~ A method according to claim ~~32~~, wherein the low-surface-tension substrate comprises polypropylene.
- 20 ~~35.~~ A method according to claim ~~30~~, wherein no external energy source is applied to the adhesive during the adhering process.
- 25 ~~36.~~ A method for adhering together at least two substrates, the method comprising:
mixing a first composition with a second composition to make an adhesive,
the first composition comprising at least one metathesizable material and the second composition comprising (i) at least one liquid metathesis oligomer or polymer and (ii) at least one metathesis catalyst;

applying the adhesive to at least one substrate; and
adhering together the substrates.

37. A method according to claim 36, wherein the second composition is prepared by
mixing together the metathesis catalyst and at least one metathesizable monomer
that forms the liquid metathesis oligomer or polymer in the presence of the
metathesis catalyst.

38. A method according to claim 37, wherein the metathesizable monomer is
selected from cyclopentene, cyclohexene, 3-ethylcyclopentene, 8-methoxy
tricyclo[5.2.1.0^{2,6}]-4-decene, 4-methylcyclohexene, and 4-
methoxymethylcyclohexene.

39. A method according to claim 36, wherein the metathesizable material is selected
from norbornadiene, norbornene and cyclobutene.

40. A method according to claim 36, wherein at least one of the substrates is a low-
surface-tension substrate.

41. A method according to claim 36, wherein the low-surface-tension substrate
comprises polypropylene.

42. A method according to claim 36, further comprising:
providing a first container containing the first composition;
providing a second container containing the second composition;
displacing the first composition out of the first container;
displacing the second composition out of the second container; and
mixing the displaced first composition and the displaced second composition
to produce the adhesive.

43. A method for coating a substrate surface, the method comprising:

mixing a first composition with a second composition to make a coating, the first composition comprising at least one metathesizable material and the second composition comprising (i) at least one liquid metathesis oligomer or polymer and (ii) at least one metathesis catalyst; and

5 applying the coating to the substrate surface.

~~44.~~ ¹⁵ A method for coating a substrate surface, the method comprising:

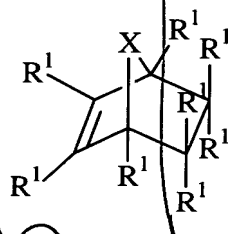
mixing a first composition with a second composition to make a coating, the first composition comprising at least one metathesizable material comprising a highly-reactive cycloolefin and the second composition comprising at least one metathesis catalyst; and

10 applying the coating to the substrate surface.

45. An adhesive or coating comprising a composition prepared by mixing together:

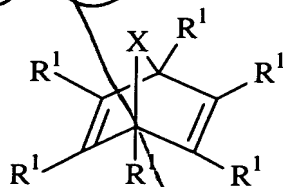
- 15 (a) at least one metathesizable material; and
(b) at least one metathesis catalyst,

wherein the metathesizable material has a structure represented by:



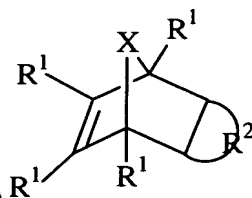
20 Formula A,

or



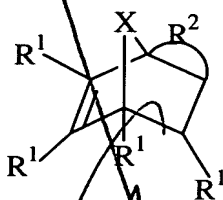
25 Formula B,

or



Formula C,

or



Formula D

wherein X is $C=C(R^3)_2$, each R^1 is independently H, CH_2 , alkyl, alkenyl (such as vinyl, allyl, or alkylidenyl), cycloalkyl, cycloalkenyl, aryl, alkaryl, aralkyl, halogen, halogenated alkyl, halogenated alkenyl, alkoxy, oxyalkyl, carboxyl, carbonyl, amido, (meth)acrylate-containing group, anhydride-containing group, thioalkoxy, sulfoxide, nitro, hydroxy, keto, carbamato, sulfonyl, sulfinyl, carboxylate, silanyl, cyano or imido; R^2 is a fused aromatic, aliphatic or heterocyclic or polycyclic ring; and R^3 is hydrogen, alkyl, alkenyl, cycloalkyl, cycloalkenyl, aryl, alkaryl, aralkyl or alkoxy.